

University of Saskatchewan  
Department of Electrical Engineering  
EE 214- System Modeling and Network Analysis  
Mid-term Examination (This is a CLOSED Book Examination)

February 8, 2006

Duration: 90 minutes

1. Consider that a third-order control system has the characteristic equation

$$s^3 + 3408.3s^2 + 1204000s + 1.5 \times 10^7 K = 0$$

Use the Routh-Hurwitz criterion to determine the range of  $K$  for stability.

2. The circuit in Fig. 1 is a voltage-to-current converter. Find the current  $i_o$  if  $V_I = 8\text{ V}$ .

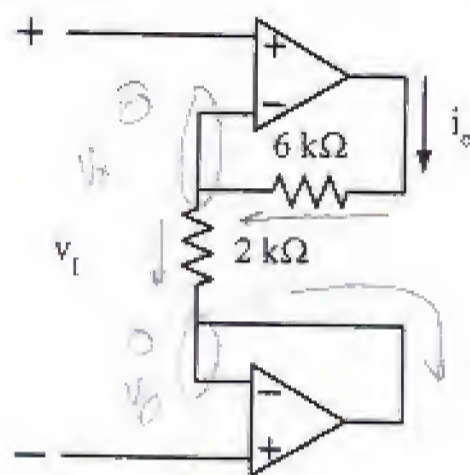


Fig. 1

3. Determine the required value of  $R$  so that  $V_o = -1.95\text{ V}$  for the circuit of Fig. 2.

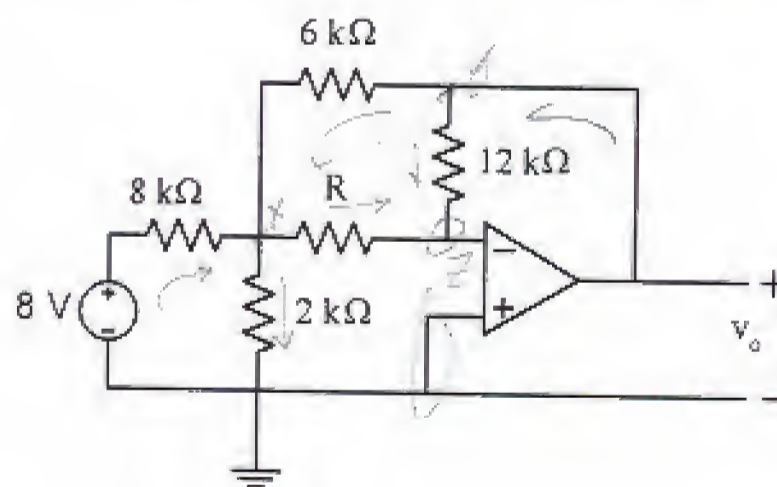


Fig. 2

4. Consider the circuit shown in Fig. 3.

Show that the transfer function can be expressed as:

$$G(s) = \frac{As}{s^2 + Bs + D}$$

Find  $A$ ,  $B$  and  $D$ .

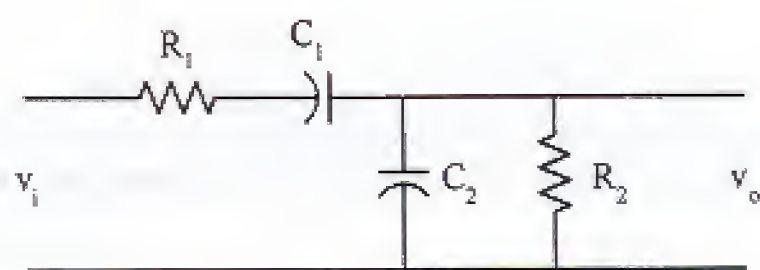


Fig. 3